

Appl. No. 09/773,172
Reply to Office Action of May 27, 2003

Docket No 6169-212
IBM Docket No. BOC9-2000-0076

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the instant application:

Listing of Claims:

Claim 1 (canceled) A method for processing dual tone multi-frequency signals for use with a natural language understanding system, said method comprising:

(a) determining whether an audio input signal is a dual tone multi-frequency signal or a human speech signal;

(b) if said audio input signal is determined to be said dual tone multi-frequency signal, converting said audio input signal to a text equivalent; and

(c) providing said text equivalent to a natural language understanding system, said natural language understanding system determining a meaning from said text equivalent.

Claim 2 (canceled) The method of claim 1, further comprising:

(d) determining one or more prosodic characteristics of said received dual tone multi-frequency signal.

Claim 3 (canceled) The method of claim 2, wherein said determined prosodic characteristics are used in said step (b) to determine said text equivalent.

Claim 4 (canceled) The method of claim 1, further comprising:

(e) if said audio input signal is determined to be a human speech signal, providing said audio input signal to a speech recognition system for converting speech to text.

Claim 5 (canceled) The method of claim 4, further comprising:

(f) collating text received from said speech recognition system with at least one said text equivalent.

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Claim 6 (canceled) The method of claim 5, wherein said step (c) comprises providing said collated text comprising text received from said speech recognition system and at least one said text equivalent to a natural language understanding system.

Claim 7 (canceled) The method of claim 1, wherein said natural language understanding system provides contextual feedback to said step (b) for converting said audio input signal identified as a dual tone multi-frequency signal to said text equivalent.

Claim 8 (currently amended) A method for processing dual tone multi-frequency signals for use with a natural language understanding system, said method comprising:

(a) receiving a user input comprising dual tone multi-frequency signals; determining at least one prosodic characteristic of the dual tone multi-frequency signals; grouping selected ones of the dual tone multi-frequency signals according to said determining step; and

(b) converting said the dual tone multi-frequency signals to a textual equivalents according to said grouping step; and

(c) providing said text equivalent to a natural language understanding system, said natural language understanding system determining a meaning from said text equivalent.

Claim 9 (currently amended) The method of claim 8, further comprising:

determining contextual information for the received user input; and one or more prosodic characteristics of said received dual tone multi-frequency signal
using the contextual information for performing said grouping and converting steps.

Claim 10 (currently amended) The method of claim 9, wherein said determined prosodic characteristics are used in said step (b) to convert said received dual tone

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~~multi-frequency signal to said text equivalent the user input further comprises user speech.~~

Claim 11 (currently amended) ~~The method of claim 8, wherein said step (c) provides contextual feedback to said step (b) for converting said received dual tone multi-frequency signal to said text equivalent said contextual information is determined by a natural language understanding system and said grouping step is performed by a dual tone multi-frequency converter, such that said natural language understanding system provides the contextual information as feedback to the dual tone multi-frequency converter.~~

Claim 12 (canceled) A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine for causing the machine to perform the steps of:

- (a) determining whether an audio input signal is a dual tone multi-frequency signal or a human speech signal;
- (b) if said audio input signal is determined to be said dual tone multi-frequency signal, converting said audio input signal to a text equivalent; and
- (c) providing said text equivalent to a natural language understanding system, said natural language understanding system determining a meaning from said text equivalent.

Claim 13 (canceled) The machine readable storage of claim 12, further comprising:

- (d) determining one or more prosodic characteristics of said received dual tone multi-frequency signal.

Claim 14 (canceled) The machine readable storage of claim 13, wherein said determined prosodic characteristics are used in said step (b) to determine said text equivalent.

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Claim 15 (canceled) The machine readable storage of claim 12 further comprising:

(e) if said audio input signal is determined to be a human speech signal, providing said audio input signal to a speech recognition system for converting speech to text.

Claim 16 (canceled) The machine readable storage of claim 15, further comprising:

(f) collating text received from said speech recognition system with at least one said text equivalent.

Claim 17 (canceled) The machine readable storage of claim 16, wherein said step (c) comprises providing said collated text comprising text received from said speech recognition system and at least one said text equivalent to a natural language understanding system.

Claim 18 (canceled) The machine readable storage of claim 12, wherein said natural language understanding system provides contextual feedback to said step (b) for converting said input signal identified as a dual tone multi-frequency signal to said text equivalent.

Claim 19 (currently amended) A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine for causing the machine to perform the steps of:

(a) receiving a user input comprising dual tone multi-frequency signals; determining at least one prosodic characteristic of the dual tone multi-frequency signals; grouping selected ones of the dual tone multi-frequency signals according to said determining step; and

(b) converting said the dual tone-multi frequency signals to a textual equivalents according to said grouping step; and

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(e) ~~providing said text equivalent to a natural language understanding system, said natural language understanding system determining a meaning from said text equivalent.~~

Claim 20 (currently amended) The machine readable storage of claim 19, further comprising:

~~determining contextual information for the received user input; and one or more presodic characteristics of said received dual tone multi frequency signal using the contextual information for performing said grouping and converting steps.~~

Claim 21 (currently amended) The machine readable storage of claim 20, wherein ~~said determined presodic characteristics are used in said step (b) to convert said received dual tone multi frequency signal to said text equivalent the user input further comprises user speech.~~

Claim 22 (currently amended) The machine readable storage of claim 19, wherein ~~said step (c) provides contextual feedback to said step (b) for converting said received dual tone multi frequency signal to said text equivalent said contextual information is determined by a natural language understanding system and said grouping step is performed by a dual tone multi-frequency converter, such that said natural language understanding system provides the contextual information as feedback to the dual tone multi-frequency converter.~~

Claim 23 (currently amended) A system for converting dual tone multi-frequency signals into text equivalents for use with a natural language understanding system, said system comprising:

~~an interactive voice response unit for receiving user inputs comprising user spoken utterances and dual tone multi-frequency signals;~~

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a dual tone multi-frequency converter configured to determine prosodic characteristic of the dual tone multi-frequency signals, group selected ones of the dual tone multi-frequency signals according to the prosodic characteristics, and convert the dual tone multi-frequency signals to text equivalents according to the groupings of dual tone multi-frequency signals for converting said dual tone multi-frequency signals into text equivalents; and

a natural language understanding system for determining a meaning from text converted from said user spoken utterances and said text equivalents.

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Claim 24 (original) The system of claim 23, further comprising:

a speech recognition system for converting said user spoken utterances to said text.

Claim 25 (original) The system of claim 24, further comprising:

a collator for collating said text converted from said user spoken utterances and said text equivalents.

Claim 26 (new) The system of claim 23, wherein said natural language understanding system determines contextual information for the user inputs and provides the contextual information to the dual tone multi-frequency converter for use in grouping the selected ones of the dual tone multi-frequency signals and converting the dual tone multi-frequency signals to text equivalents.

Claim 27 (new) A system for converting dual tone multi-frequency signals into text equivalents for use with a natural language understanding system, said system comprising:

means for receiving a user input comprising dual tone multi-frequency signals;
means for determining at least one prosodic characteristic of the dual tone multi-frequency signals;

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means for grouping selected ones of the dual tone multi-frequency signals according to said determining step; and

means for converting the dual tone-multi frequency signals to textual equivalents according to said grouping step.

Claim 28 (new) The system of claim 27, further comprising:

means for determining contextual information for the received user input; and

means for using the contextual information for performing said grouping and converting steps.

Claim 29 (new) The system of claim 28, wherein the user input further comprises user speech.

Claim 30 (new) The system of claim 27, wherein said means for determining contextual information provide the contextual information to said means for grouping and said means for converting.